Space Weather Forecast

Issued on Friday, 16 September 2022 at 13:26 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of a Minor Geomagnetic Storm. Chance of Minor/Moderate Radio blackouts, but risk falling later in weekend. Slight chance of a potential Coronal Mass Ejection arriving at Earth later in the period.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was High over the past 24 hours, with a strong Moderate class flare, peaking at 16/0949 UTC, which appears to have originated from AR3098 located on the west limb. Subsequently, this has produced an R2 Radio Blackout. We are awaiting coronagraph imagery for any potential CME associated with this event.

Meanwhile, a low level Common class flare associated with a filament eruption in the southwest quadrant earlier on the 15th, produced a Coronal Mass Ejection, which is likely to have an Earth directed component. This event is currently under going further analysis to ascertain if there is any Earth-directed component.

Currently there are four sunspot regions on the Sun, with three of the regions large and elongated. Despite their size two of these elongated regions appear stable and relatively magnetically simple, whereas AR3098 approaching the northwest limb is relatively complex, and is therefore the most likely source for further significant flares.

Solar Wind / Geomagnetic Activity: The solar wind as at slow ambient levels throughout, generally close to 350 km/s, after the previous day's CME arrival. The solar wind's magnetic field started at moderate levels but quickly declined to become weak. The north-south component of the magnetic field was positive throughout, with a steady decline towards negative values. Geomagnetic activity was Quiet.

Energetic Particles / Solar Radiation: While no solar radiation storms have been observed in the period, the high energy proton flux was initially near background levels, becoming slightly elevated following the recent strong Moderate class flare from AR3098 on the west limb.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to remain predominantly at Low levels, with a chance of further M-Class flares, today and tomorrow. Thereafter solar activity is expected to decline, as AR3098 rotates off the Earth-facing disc. No notable regions are due over the limb to compensate.

Solar Wind / Geomagnetic Activity: After starting at background speeds the solar wind is expected to become enhanced later today or early tomorrow, due to the arrival of a fast wind from coronal hole features. This means the geomagnetic activity will be Quiet to Unsettled today, then increasing Unsettled to Active overnight with a chance of a Minor geomagnetic storm. From day 3 (18th) geomagnetic activity is excepted to decline to Quiet levels.

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Met Office Space Weather Forecast

Energetic Particles / Solar Radiation: There is a Slight Chance of S1, mainly today and tomorrow, before the most active and complex region rotates off the visible disc.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	40	30	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	40	20	15	5
Very Active	R3 to R5 X	No	5	5	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	15	15	5	1
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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